

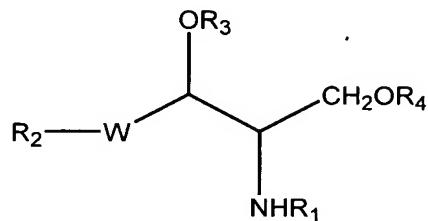
Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-29 (Cancelled)

30. (New) A compound of formula (I):



wherein

R₁ represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group -C(O)R₅;

R₂ and **R**₅ represent, independently, a branched or linear C₁₀-C₂₄ alkyl, alkenyl or polyenyl groups;

R₃ and **R**₄ are independently a group -C(O)-NR₆R₇, **R**₆ and **R**₇ being the same or different for R₃ and R₄ and represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine

units in said polyalkylamine may be a quaternary ammonium; or **R₃** is a hydrogen; or

R₃ and **R₄** form together with the oxygen atoms to which they are bound a heterocyclic ring comprising $-C(O)-NR_9-[R_8-NR_9]_m-C(O)-$, **R₈** represents a saturated or unsaturated C₁-C₄ alkyl and **R₉** represents a hydrogen or a polyalkylamine of the formula $-[R_8-NR_9]_n-$, wherein said **R₉** or each alkylamine unit **R₈NR₉** may be the same or different in said polyalkylamine; and

n and **m**, represent independently an integer from 1 to 10;

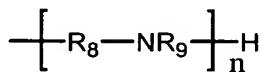
W represents a group selected from $-CH=CH-$, $-CH_2-$ $CH(OH)-$ or $-CH_2-CH_2-$.

31. (New) The compound of Claim 30, wherein **R₁** represents a $-C(O)R_5$ group, **R₅** being as defined.

32. (New) The compound of Claim 30, wherein said **R₂** and **R₅** represent, independently, a linear or branched C₁₂-C₁₈ alkyl or alkenyl groups.

33. (New) The compound of Claim 30, wherein **W** represents $-CH=CH-$.

34. (New) The compound of Claim 30, wherein \mathbf{R}_1 represents a $-\text{C}(\text{O})\mathbf{R}_5$ group; \mathbf{R}_5 represents a $\text{C}_{12}\text{--}\text{C}_{18}$ linear or branched alkyl or alkenyl; \mathbf{W} represents $-\text{CH}=\text{CH}-$; \mathbf{R}_2 represents a $\text{C}_{12}\text{--}\text{C}_{18}$ linear or branched alkyl or alkenyl; \mathbf{R}_3 and \mathbf{R}_4 represent, independently, a group $\text{C}(\text{O})-\text{NR}_6\mathbf{R}_7$, and \mathbf{R}_3 may also represent a hydrogen, wherein \mathbf{R}_6 and \mathbf{R}_7 represent, independently, a hydrogen or a polyalkylamine having the general formula (II):



wherein

\mathbf{R}_8 represent a $\text{C}_1\text{--}\text{C}_4$ alkyl;

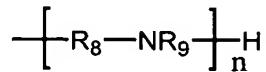
\mathbf{R}_9 represents a hydrogen or a polyalkylamine branch of formula (II), said \mathbf{R}_8 and \mathbf{R}_9 may be the same or different for each alkylamine unit, $-\text{R}_8\text{NR}_9-$, in the polyalkylamine of formula (II); and

n represents an integer from 3 to 6.

35. (New) The compound of Claim 34, wherein \mathbf{R}_3 is a hydrogen atom.

36. (New) The compound of Claim 30, wherein \mathbf{R}_1 represents a $-\text{C}(\text{O})\mathbf{R}_5$ group; \mathbf{R}_5 represents a $\text{C}_{12}\text{--}\text{C}_{18}$ linear or branched alkyl or alkenyl; \mathbf{W} represents $-\text{CH}=\text{CH}-$; \mathbf{R}_2 represents a $\text{C}_{12}\text{--}\text{C}_{18}$ linear or branched alkyl or alkenyl; \mathbf{R}_3 and \mathbf{R}_4 represent independently a group $\text{C}(\text{O})-\text{NR}_6\mathbf{R}_7$, wherein \mathbf{R}_6 and \mathbf{R}_7 represent,

independently, an alkylamine or a polyalkylamine having the general formula (II):



wherein

R₈ represent a C₁-C₄ alkyl;

R₉ represents a hydrogen or a polyalkylamine branch of formula (II), said R₈ and R₉ may be the same or different for each alkylamine unit, -R₈NR₉-, in the polyalkylamine of formula (II); and

n represents an integer from 3 to 6.

37. (New) The compound of Claim 30, wherein **R**₁ represents a C(O)R₅ group; R₅ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; **W** represents -CH=CH-; **R**₂ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; **R**₃ and **R**₄ form together with the oxygen atoms to which they are bonded a heterocyclic ring comprising -C(O)-[NH-R₈]_n-NH-C(O)-,

wherein

R₈ represents a C₁-C₄ alkyl, wherein for each alkylamine unit having the formula -NH-R₈-, said R₈ may be the same or different; and

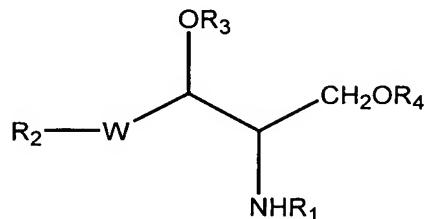
n represents an integer from 3 to 6.

38. (New) The compound of Claim 30, wherein said R₈ is a C₃-C₄ alkyl.

39. (New) The compound of Claim 30, being N-palmitoyl D-erythro sphingosyl-1-carbamoyl spermine.

40. (New) The compound of Claim 30, having the chemical structure as depicted in Fig. 2C.

41. (New) A process for the preparation of a sphingoid-polyalkylamine conjugate of formula (I)



wherein

R₁ represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group -C(O)R₅;

R₂ and **R**₅ represent, independently, a branched or linear C₁₀-C₂₄ alkyl, alkenyl or polyenyl groups;

R₃ and **R**₄ are independently a group -C(O)-NR₆R₇, **R**₆ and **R**₇ being the same or different for R₃ and R₄ and represent, independently, a hydrogen, or a saturated or unsaturated

branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or

R₃ represents a hydrogen; or

R₃ and **R**₄ form together with the oxygen atoms to which they are bound a heterocyclic ring comprising -C(O)-NR₉-[R₈-NR₉]_m-C(O)-, **R**₈ represents a saturated or unsaturated C₁-C₄ alkyl and **R**₉ represents a hydrogen or a polyalkylamine of the formula -[R₈-NR₉]_n-, wherein said R₉ or each alkylamine unit R₈NR₉ may be the same or different in said polyalkylamine; and

n and **m** represent independently an integer from 1 to 10;

W represents a group selected from -CH=CH-, -CH₂-CH(OH)- or -CH₂-CH₂-;

the process comprises:

(a) providing a sphingoid compound of formula (I) wherein R₁, R₂ and W have the meaning as defined above and R₃ and R₄ represent, independently, a hydrogen atom or an oxo protecting group, wherein at least one of said R₃ and R₄ represent a hydrogen atom;

(b) reacting said compound of step (a) with an activating agent, optionally in the presence of a catalyst, to obtain an activated R₃ and/or R₄ group;

(c) reacting said activated sphingoid compound with a polyalkylamine;

(d) removing said protecting group thereby obtaining said sphingoid-polyalkylamine conjugate of formula (I) as defined above.

42. (New) The process of Claim 41, wherein said sphingoid-polyalkylamine conjugate is N-palmitoyl D-erythro sphingosyl-1-carbamoyl spermine.

43. (New) The process of Claim 41, wherein said protecting group is a primary amine protecting group selected from trifluoroacetamide, fmoc, carbobenzoxy (CBZ), dialkyl Phosphoramidates.

44. (New) The process of Claim 41, wherein said activating agent is selected from N,N'-disuccinimidylcarbonate, di- or tri-phosgene or an imidazole derivative.

45. (New) The process of Claim 41, wherein said activation is performed in the presence of a catalyst, the catalyst being selected from 4-dimethylamino pyridine (DMAP), tetrazole, dicyanoimidazole or diisopropylethylamine.

46. (New) The process of Claim 41, for obtaining a di-substituted sphingoid-polyalkylamine conjugate, wherein

in step (a) both R_3 and R_4 are hydrogen atoms, and said process comprises reacting the compound of formula (I) with at least two equivalents of polyalkylamine to obtain a disubstituted sphingoid-polyalkylamine conjugate, with identical polyalkylamine substituents.

47. (New) The process of Claim 41, for obtaining a di-substituted sphingoid-polyalkylamine conjugate, wherein

in step (a) at least one of R_3 or R_4 is protected with a protecting group, the process comprises reacting in step (c) the activated sphingoid compound with a first polyalkylamine; removing the protecting group of R_3 or R_4 to obtain an unprotected oxo group; reacting the unprotected compound with an activating agent to obtain an activated mono-substituted sphingoid-polyalkylamine conjugate; and reacting said activated mono-substituted sphingoid-polyalkylamine conjugate with a second polyalkylamine, thereby obtaining a di-substituted sphingoid-polyalkylamine conjugate, said first and second polyalkylamine may be the same or different.

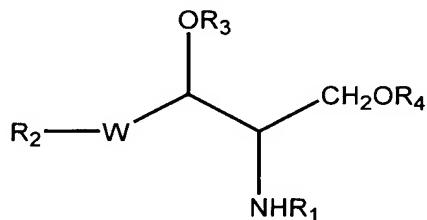
48. (New) The process of Claim 41, for obtaining a heterocyclic sphingoid-polyalkylamine conjugate, wherein

in step (a) both R_3 and R_4 are hydrogen atoms, said sphingoid compound is reacted with at least two equivalents of

an activating agent to obtain an activated sphingoid with both R₃ and R₄ activated and reacting said activated sphingoid compound with less than an equivalent of polyalkylamine, thereby obtaining a heterocyclic sphingoid-polyalkylamine conjugate.

49. (New) The process of Claim 41, for obtaining any one of the sphingoid-polyalkylamine conjugates as depicted in Figs. 1A to 1D.

50. (New) A composition comprising a sphingoid-polyalkylamine conjugate of the formula (I):



wherein

R₁ represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group -C(O)R₅;

R₂ and R₅ represent, independently, a branched or linear C₁₀-C₂₄ alkyl, alkenyl or polyenyl groups;

R₃ and R₄ are independently a group -C(O)-NR₆R₇, R₆ and R₇ being the same or different for R₃ and R₄ and represent, independently, a hydrogen, or a saturated or unsaturated

branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or

R₃ is a hydrogen; or

R₃ and **R**₄ form together with the oxygen atoms to which they are bound a heterocyclic ring comprising -C(O)-NR₉-[R₈-NR₉]_m-C(O)-, **R**₈ represents a saturated or unsaturated C₁-C₄ alkyl and **R**₉ represents a hydrogen or a polyalkylamine of the formula -[R₈-NR₉]_n-, wherein said R₉ or each alkylamine unit R₈NR₉ may be the same or different in said polyalkylamine; an

n and **m** are independently an integer from 1 to 10;

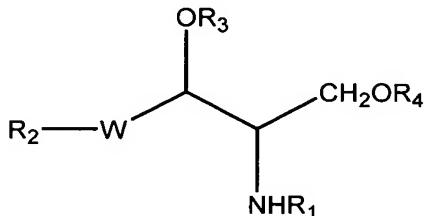
W represents a group selected from -CH=CH-, -CH₂-CH(OH)- or -CH₂-CH₂-.

51. (New) The composition of Claim 50, further comprising a pharmaceutically acceptable carrier.

52. (New) The composition of Claim 50, wherein said sphingoid-polyalkylamine conjugate is N-palmitoyl D-erythro sphingosyl-1-carbamoyl spermine.

53. (New) The composition of Claim 50, further comprising a biologically active molecule.

54. (New) In the method of capturing a molecule having a negative charge, a negative dipole or a local negative dipole with a conjugate capable of capturing said molecule by electrostatic interaction, the improvement wherein said conjugate is a compound of formula (I):



wherein

R₁ represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group -C(O)R₅;

R₂ and **R**₅ represent, independently, a branched or linear C₁₀-C₂₄ alkyl, alkenyl or polyenyl groups;

R₃ and **R**₄ are independently a group -C(O)-NR₆R₇, **R**₆ and **R**₇ being the same or different for R₃ and R₄ and represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or

R₃ is a hydrogen; or

R₃ and **R**₄ form together with the oxygen atoms to which they are bound a heterocyclic ring comprising -C(O)-NR₉-[R₈-NR₉]_m-C(O)-, **R**₈ represents a saturated or unsaturated C₁-C₄ alkyl and **R**₉ represents a hydrogen or a polyalkylamine of the formula

-[R₈-NR₉]_n-, wherein said R₉ or each alkylamine unit R₈NR₉ may be the same or different in said polyalkylamine; and n and m are independently an integer from 1 to 10;

W represents a group selected from -CH=CH-, -CH₂-CH(OH)- or -CH₂-CH₂-.

55. (New) The use of Claim 54, wherein said compound is N-palmitoyl D-erythro sphingosyl-1-carbamoyl spermine.

56. (New) A kit comprising a compound according to Claim 30 and instructions for use of said compound as a capturing agent.

57. (New) The method of Claim 56, wherein said compound is N-palmitoyl D-erythro sphingosyl-1-carbamoyl spermine.

58. (New) The compound of Claim 30, wherein R₁ represents a -C(O)R₅ group; R₅ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; W represents -CH=CH-; R₂ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; R₃ and R₄ are independently a group -C(O)-NR₆R₇, R₆ and R₇ being the same or different for R₃ and R₄ and represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine,

wherein one or more amine units in said polyalkylamine may be a quaternary ammonium; or R_3 is a hydrogen.